

# 2040 Regional Transportation Plan

## Appendix M

### FAST Act Planning Factors

Updated October 2018

## Fixing America's Surface Transportation Act

Fixing America's Surface Transportation Act's (FAST Act) final planning rules for the Metropolitan Planning Process and the Metropolitan Transportation Plan (MTP) will become effective on May 27, 2018. The FAST Act builds on the changes made by MAP-21 including provisions to make surface transportation more streamlined, performance-based, and multimodal, and to address challenges facing the U.S. transportation system, including safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery.

The FAST Act requirements for the 2040 Regional Transportation Plan include inclusion of new planning factors, consideration of intercity bus connections, transit asset management, and federally required performance targets. H-GAC adopted performance measure targets with the performancebased planning process within the time constraints required by FHWA. As a data clearinghouse, H-GAC will provide regional data to the Texas Department of Transportation when updates become available.

## New Planning Factors

### Improve Resiliency and Reliability of transportation system and reduce or mitigate storm water impacts of surface transportation

H-GAC has ongoing resiliency planning efforts which propose strategies to mitigate the effects of flooding and other extreme weather impacts, and processes in place to regularly update reports.

Resiliency is defined as: “The ability of transportation infrastructure to maintain operations and be able to recover from disaster”.

In 2017, Hurricane Harvey had a major impact on transportation networks and severely disrupted the movement of people and goods across the H-GAC’s Metropolitan Planning Area. All 22 of Houston’s major bayous spilled over their banks, with some exceeding 10 ft. above the channel banks. Additionally, Houston’s two major reservoirs, Addicks and Barker, were quickly inundated by rainfall and their levels reached the top of their emergency spillways. The Brazos River in Fort Bend County, which drains an area larger than 45,000 square miles, quickly entered major flood stage as its water level exceeded the previous record stage by almost 2 ft and flooding along the Brazos River in Ft. Bend County overwhelmed protective levees in some areas. North of the city, the San Jacinto River also flooded <sup>xviii</sup>.

Because of their importance to public safety, mobility and the state and region’s economy, TxDOT and local governments have identified a list of roadways which should be considered for additional flood mitigation (shown in Table 1(TxDOT) and Table 2 (City of Houston)). Many of these roadways were also flooded by one or more recent flood events (Tax Day flood, Memorial Day Flood, Hurricane Ike, Tropical Storm Allison, etc.). Figure 1 shows state roadway segments in need of elevation above flood levels (note: project numbers do not correspond to priority).

The cost estimates shown in Table 1 reflect the potential cost to elevate the identified state roadway segments above flood levels. At a value of almost \$2.6 billion, it should be noted that roadway elevation may not be the only, best or preferred strategy for mitigation of flooding on these critical roadways. Improved capacity for regional and/or localized flood detention, improvements to reservoir capacity, reservoir management and other flood control strategies may be examined as well.

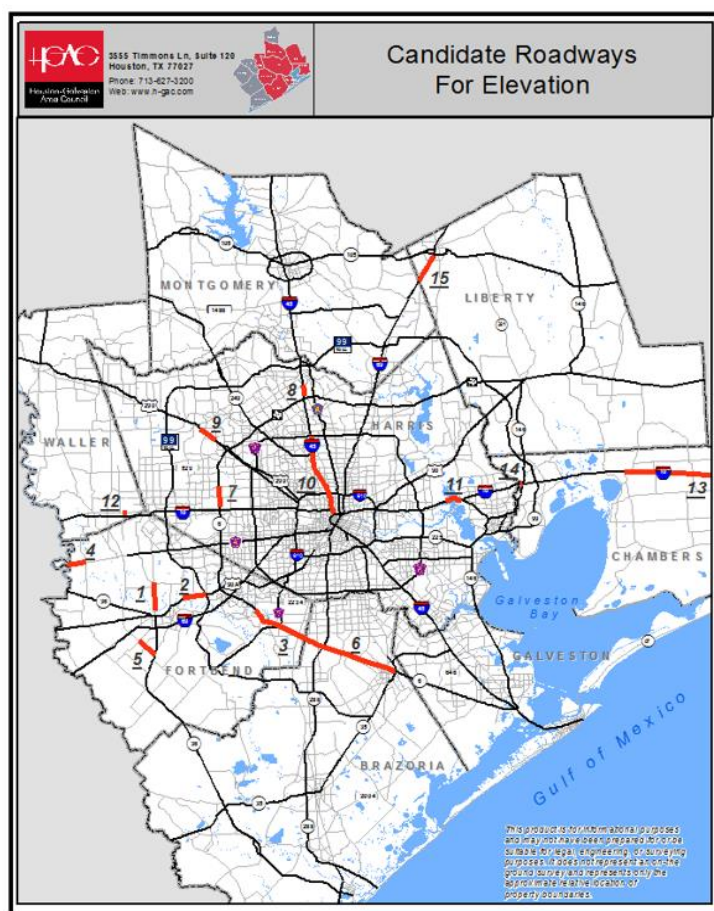


Figure 1 - Possible Roadway Elevation Segments

State Roadways Identified by TxDOT as Candidates for Repair, Elevation or Other Flood Prevention Treatments					
Proj #	County	Roadway	Limits	Estimates	Description
1	Fort Bend	FM 723	Brazos River to FM 359	100,000,000	elevate pavement
2	Fort Bend	US 90 A	FM 359 to SH 99	50,000,000	elevate pavement and replace bridges
3	Fort Bend	SH 6	Fort Bend County Line to FM 1092	250,000,000	elevate pavement and replace bridges
4	Fort Bend	FM 1093	Brazos River to FM 1489	75,000,000	elevate pavement
5	Fort Bend	Spur 10	SH 36 to Cottonwood School	60,000,000	elevate pavement
6	Brazoria	SH 6	SH 35 to Fort Bend County Line	450,000,000	elevate pavement and replace bridges
7	Harris	SH 6	Addicks Dam to Clay Road	200,000,000	bridge roadway through reservoir
8	Harris	I 45 N	Cypresswood to Parramatta	250,000,000	elevating pavement and rebuild two intersections
9	Harris	US 290	Skinner Road to Telge Road	200,000,000	elevating pavement and rebuild two intersections
10	Harris	I 45 N	I 10 to BW 8	TBD	elevate pavement and replace bridges
11	Harris	I 10 E	Monmouth to Spur 330	2,000,000	elevate pavement and replace bridges
12	Waller	I 10	1000' East and West Petterson Road	75,000,000	replace and build urban intersection
13	Chambers	I 10	SH 61 to FM 1406	635,000,000	elevate pavement and replace bridges
14	Chambers	I 10	0.75 mi West of SH 146 to SH 146	32,000,000	elevate pavement
15	Liberty	US 59	SL 573 to Montgomery Co/L	180,000,000	elevate pavement and replace bridges
			Total Estimate	\$2,559,000,000	
Source: Texas Department of Transportation Houston and Beaumont Districts					

Table 1 – State Roadways Identified by TxDOT as Candidates for Repair, Elevations or Other Flood Prevention

Roadways Identified by City of Houston as Candidates for Repair, Elevation or Other Flood Prevention Treatments					
Project #	County - City	Roadway	Limits	Estimates	Description
1	Harris - Houston	Gellhorn	IH-10 to IH-610	\$5,700,000	Mitigation effort to maintain accessibility to food distribution centers
2	Harris - Houston	IH-610 @ Stella Link	at 610 intersections	TBD	Mitigation effort for underpass to remain accessible during rain events
3	Harris - Houston	IH-610 @ Kirby	at 610 intersections	TBD	Mitigation effort for underpass to remain accessible during rain events

4	Harris - Houston	IH-610 @ Fannin	at 610 intersection	TBD	Mitigation effort for underpass to remain accessible during rain events
5	Harris - Houston	Normandy	at Greens Bayou	\$2,400,000	Bridge elevation over Greens Bayou
6	Harris - Houston	Woodforest	at Greens Bayou	\$9,600,000	Bridge elevation over Greens Bayou, and causeway or other mitigation to remove roadway from 100-year floodplain
7	Harris - Houston	Kress	at I-10	TBD	Connection for freight mobility during rain events
8	Harris - Houston	I-10 @ Patterson	at I-10	TBD	Mitigation effort for Transportation Operations Facility to remain accessible during rain events (issue on I-10 feeder)
9	Harris - Houston	Katy Road	at Railroad underpass	TBD	Mitigation effort for TranStar to remain accessible during rain events
10	Harris - Houston	Navigation and 75th	Intersection	TBD	Mitigation effort to provide access for industry and freight mobility
11	Harris - Houston	Oates Road	I-10 to 90A	\$6,528,000	Mitigation effort to remain accessible during rain events or elevate roadway out of 100-year floodplain
12	Harris - Houston	Will Clayton Blvd	Kenswick to Airport Terminal	\$14,400,000	Causeway or other mitigation effort for IAH to remain accessible during rain events
13	Harris - Houston	Greens Road	John F. Kennedy Blvd to US 59	\$24,000,000	Causeway or other mitigation effort for IAH to remain accessible during rain events
14	Harris - Houston	Main Street	Holcombe intersection	\$360,000	Flood Warning System
15	Harris - Houston	Elgin	Railroad intersection	\$360,000	Flood Warning System
16	Harris - Houston	Allen Parkway	Montrose intersection	\$360,000	Flood Warning System
17	Harris - Houston	Allen Parkway	Waugh intersection	\$360,000	Flood Warning System
18	Harris - Houston	Fannin	Holcombe intersection	\$360,000	Flood Warning System
19	Harris - Houston	6514 Jensen	Railroad intersection	\$360,000	Flood Warning System
20	Harris - Houston	1700 Jensen	Railroad intersection	\$360,000	Flood Warning System

21	Harris - Houston	3500 Kelley	Railroad intersection	\$360,000	Flood Warning System
22	Harris - Houston	5800 Elysian	Railroad intersection	\$360,000	Flood Warning System
23	Harris - Houston	7506 Hardy	Railroad intersection	\$360,000	Flood Warning System
24	Harris - Houston	5405 Mesa	Railroad intersection	\$360,000	Flood Warning System
25	Harris - Houston	4899 Old Galveston Road	Railroad intersection	\$360,000	Flood Warning System
26	Harris - Houston	Houston Ave	Memorial Drive intersection	\$360,000	Flood Warning System
27	Harris - Houston	Shepherd Drive	Memorial Drive intersection	\$360,000	Flood Warning System
28	Harris - Houston	Houston Ave	Railroad intersection	\$360,000	Flood Warning System
29	Harris - Houston	North Main St.	Railroad intersection	\$360,000	Flood Warning System
30	Harris - Houston	Clinton Drive	Railroad intersection	\$360,000	Flood Warning System
31	Harris - Houston	Yale Street	Railroad intersection	\$360,000	Flood Warning System
32	Harris - Houston	Lawndale	Railroad intersection	\$360,000	Flood Warning System
33	Harris - Houston	Broadway	Railroad intersection	\$360,000	Flood Warning System
34	Harris - Houston	75th Street	Railroad intersection	\$360,000	Flood Warning System
35	Harris - Houston	Harrisburg	Railroad intersection	\$360,000	Flood Warning System
36	Harris - Houston	Forest Hill	Railroad intersection	\$360,000	Flood Warning System
37	Harris - Houston	Wayside	Lawndale intersection	\$360,000	Flood Warning System
38	Harris - Houston	Polk	Railroad intersection	\$360,000	Flood Warning System
39	Harris - Houston	Franklin	Commerce Underpass	\$360,000	Flood Warning System
40	Harris - Houston	Old Spanish Trail	Railroad intersection	\$360,000	Flood Warning System
41	Harris - Houston	Studemont	Railroad intersection	\$360,000	Flood Warning System
Total Estimate				<b>\$72,708,000</b>	
Source: City of Houston PWE					

Table 2 –Roadways Identified by City of Houston as Candidates for Repair, Elevations or Other Flood Prevention

City of Houston identified roadways for flood prevention, repair and elevation are estimated to cost approximately \$73 million.

H-GAC planning reports such as “Our Region 2040” and the “Foresight Panel on Environmental Effects” analyze the impacts of weather on the region and its transportation system. Major recent

rainfall events such as Hurricane Harvey in 2017 demonstrate the region's susceptibility to flooding. Severe heat and drought also become an issue for transportation assets during the summer. Tide or tropical system-related erosion pose an issue along the coastlines and inland waterways. It is expected that due to a changing climate, weather events will intensify and occur with greater frequency.

Through programming and partnerships, H-GAC has addressed extreme weather preparedness, mitigation, and evacuation. H-GAC, the Texas Division of Emergency Management (DEM), and 85 local governments collaborated to develop a comprehensive Regional Hazard Mitigation Plan<sup>i</sup>. The plan identifies regional hazards and vulnerabilities and includes over 300 mitigation projects that could be implemented within the region.

To address aspects of resiliency and reliability that include preparedness and evacuation, the "Together Against the Weather"<sup>ii</sup> outreach campaign was initiated. As a web clearinghouse, it provides service providers, emergency management officials, churches, and healthcare providers with materials to help at-risk populations in the event of a major landfalling hurricane. Available resources include preparedness information, evacuation route maps, and Office of Emergency management links. A goal of preparedness for natural disasters is also found in the Comprehensive Economic Development Strategy (CEDS<sup>iii</sup>) and emphasizes less expensive approaches to reducing vulnerability such as using natural landscape for absorbing floodwaters and storm surge and making wiser decisions regarding building locations. For protecting key assets, the recommended approach is one that carefully targets structural solutions to keep costs lower. Another supporting strategy is to assist local governments to conduct economic vulnerability assessments, encompassing vulnerability to natural disasters. Along with reducing vulnerability risk, preparedness strategies involve speeding the rate of recovery to improve safety and quality of life.

H-GAC provides interactive mapping tools such as the Regional Flood Information viewer (see Fig. 2) displaying critical facilities including transportation, high-density areas, and vulnerable populations.

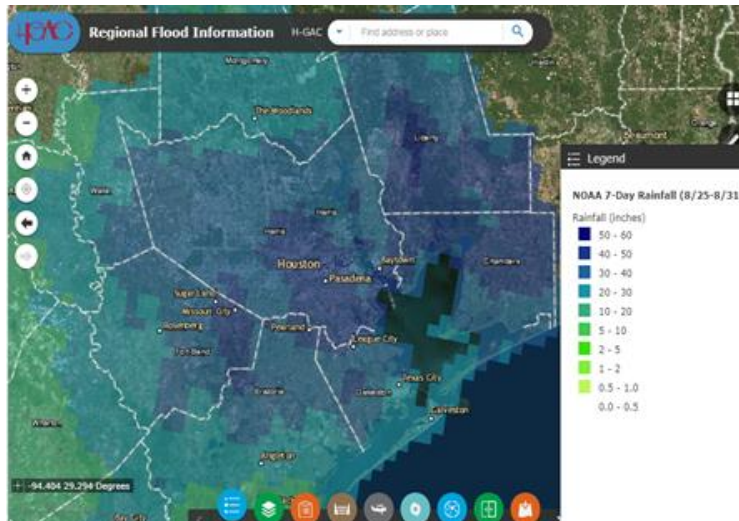


Figure 2 – 7-Day Rainfall Totals from Harvey

H-GAC also administers the Homeland Security Planning program<sup>iv</sup> that promotes regional planning and response to man-made and natural disasters. The Regional Homeland Security Coordinating Council (RGSCC) assists and advises elected officials in their decision-making responsibilities on matters related to regional homeland security issues. H-GAC is working closely with individual counties in the development of Hazard Mitigation Plans and will continue to aid and assist in the process of updating these plans.

Using FHWA's Vulnerability Assessment Framework tool, H-GAC will assess the vulnerability and risk of the region's transportation system to extreme weather impacts and other current and future environmental conditions. This process will ensure that vulnerable infrastructure and climate variables are categorized, provide a method of updating previous resiliency and reliability planning, and promote inclusion of resiliency and reliability strategies and investment priorities into the RTP. Other primary objectives of the current effort include:

#### *Data Collection*

- Compile and gather information from previous and ongoing resiliency planning efforts in the region including but not limited to regional hazardous mitigation plans, and emergency management plans, Our Great region 2040, H-GAC Foresight Panel on Environmental Effects, etc.
- Collect relevant data on vulnerability of transportation infrastructure, climate variables, regional environmental hazards and impacts
- Make projections for the extent of climate impacts
- Identify vulnerabilities in transportation infrastructure

#### *Assessment*

- Use FHWA's Climate Data Processing Tool and Sensitivity Matrix to assess criticality in Transportation Adaptation Planning and vulnerability level of critical transportation assets
- Define Critical Regional Transportation Assets
- Use FHWA Vulnerability Assessment Scoring Tool (VAST) to score all critical transportation assets
- Analyze and prioritize adaptation options based on the results of VAST scores
- Prepare a Vulnerability Assessment Summary Report summarizing information from the Data Collection and Assessment activities



*Strategy Development*

- Develop strategies to maintain and improve vulnerable transportation assets based on existing status and future projections
- Develop recommendations to integrate resiliency planning to inform project identification and selection in the Transportation Improvement Program, Regional Transportation Plan, and other planning documents as appropriate
- Update H-GAC Foresight Panel on Environmental Effects Report

*Information Dissemination*

- Disseminate vulnerability assessment findings and options to regional stakeholders
- Create and disseminate a final report through website
- Deliver at least four presentations to relevant H-GAC committees

**Enhance Travel and Tourism**

The H-GAC MPO participated in a consortium to develop the “Our Great Region 2040” plan which included a 24-partner coordinating committee, government advisory committee, members of the public, local leaders and regional workgroups. Transportation strategies related to tourism travel for the H-GAC MPO to lead in implementing include<sup>v</sup>:

- Optimize existing transportation network through a ‘Fix it First’ strategy and by using technology and improved incident management to maximize system capacity.
- Create a regional framework for expanding transit across the Region.
- Develop and implement policies to improve transit, pedestrian, and bicycle access between and within activity centers, connecting residents to job centers.
- Include economic, safety, and quality of life costs and benefits of transportation projects in funding prioritizations.

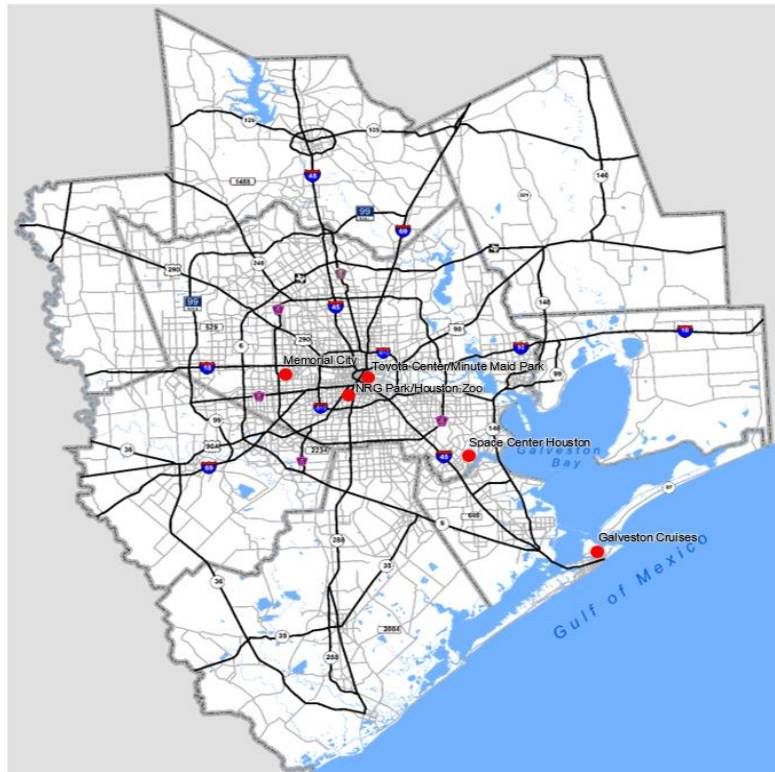


Figure 3 – Travel and Tourism Destinations

Tourism is a robust industry across the Houston-Galveston Region. On an annual basis, the Metropolitan Statistical Area attracts 14.8 million visitors which generates \$1.1 billion in local and state tax revenue. Travelers are primarily local and visit arts, festivals, sports and cuisine as well as to special attractions such as the Kemah Boardwalk, Houston Zoo, Brazoria National Wildlife refuge, George R. Brown Convention Center, museums, shopping malls, NASA space center, and Galveston Cruise Terminals (see Figure 3). Galveston Island saw 6.5 million visitors in 2016 and almost 14 percent of these were cruise travelers, an increase of 5 percent from the previous year.<sup>vi</sup> Travel originating from outside of the region is also generated from a significant business presence that includes five Fortune 500 companies and many high-density employment centers. The tourism industry alone employed 129,000 in 2015.<sup>vii</sup>

The CEDS and “Our Great Region 2040” plan regard tourism as regional needs and provide strategies and recommendations for further travel and tourism improvements. The CEDS identified tourism as a “Medium Priority” regional need. This is inclusive of eco, coastal and traditional tourism.<sup>viii</sup> The region has seen a host of local planning activities supported by Economic Development Administration grants and similar funding geared toward furthering economic development to attract business and encourage tourism.<sup>ix</sup> Programs are being implemented by the City of Houston, Bay City, Columbus, Conroe, Dayton, Galveston, and others.

An engagement process soliciting the feedback of public officials and members of the public was utilized to form a SWOT analysis, helping to shape the goals and strategies of the CEDS.<sup>x</sup> These goals have been aligned with the “Our Great Region 2040”, including the preservation of natural resources – especially along waterways – to promote, among others, recreation and tourism opportunities. One of the strategies supporting natural resource preservation recommends the creation of a regional campaign to promote eco-, coastal and wildlife tourism options across the region.<sup>xi</sup> Another strategy encourages developing a regional toolkit to capitalize on future growth sectors including tourism.<sup>xii</sup>

## Transit

**Intercity Buses** The Regional Transit Framework Study analyzed the regional intercity bus network and identified the level of priority for connections to intercity buses within public and private transit service areas. Intercity buses connect Houston to Texas and Louisiana cities including Austin, San Antonio, Dallas and New Orleans. Bus terminals are located in all TMA counties except for Liberty, including several in Downtown. Findings and recommendations for intercity bus connectivity will be incorporated into the 2045 RTP<sup>xiii</sup>.

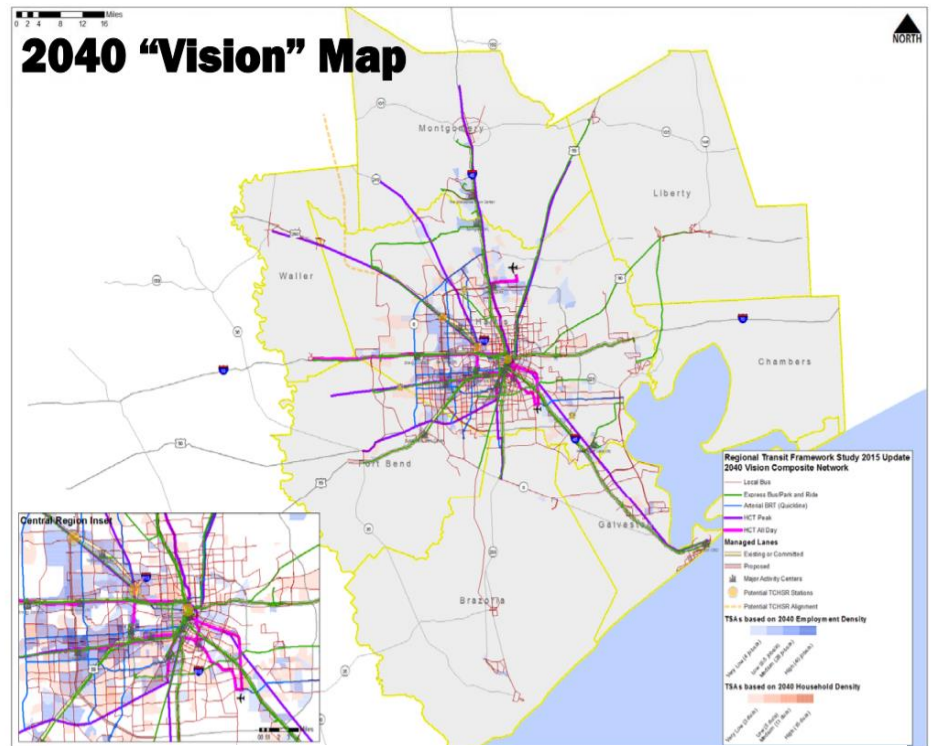


Figure 4 – Regional Vision Map, Transit Framework Study

Two service providers have been identified as providing intercity bus service within their service areas.<sup>xiv</sup> These include: the Brazos Transit District (BTD), located in the City of Conroe and The Woodlands, and Colorado Valley Transit District (CVTD), located in Austin, Colorado, Waller and Wharton Counties. In BTD, Greyhound operates routes through the transit area and makes connections to BTD service. In the CVTD, four private intercity bus companies: Arrow Trailways of Texas, Kerrville Bus Company, Greyhound, and Valley Transit Company, operate routes within the service area.<sup>14</sup> Travel patterns across the region include commuter trips from the Woodlands, Conroe, Galveston and Katy into employment centers located within Loop 610. These factors have helped determine a 2040 Vision for transit which includes High-Capacity Transit (HCT) along corridors with the highest traffic projections.

The RCTP gap analysis produced four recommendations to address transit service gaps which consider factors such as: median household income, persons with disabilities, households without automobiles, and population density. One recommendation calls for enhancing regional and intercity connectivity of transit service to improve mobility for all riders travelling to and between locations throughout the Gulf Coast Region.<sup>xv</sup>

In addition to the RCTP analysis, the Regional Transit Framework Study analyzed the region's transit connectivity. The effort resulted in short and long-term recommendations for transit; one category in the consensus recommendations is intercity bus connectivity enhancement between

providers. Figure 4 illustrates a composite service network of local, express, bus rapid transit (BRT), and High-Capacity Transit (HCT).

## Performance Measures

The federal legislation Fixing America's Surface Transportation Act, or FAST Act requires states and MPOs to monitor the transportation system using specific performance measures to address the national goals. Table 1 lists specific measures in various performance areas for transportation system. MPOs are required to either support the state targets or establish their own specific targets for all performance measures in the MPO planning area within 180 days after the State establishes each target. H-GAC worked cooperatively with TxDOT to establish safety performance targets and continues to work with TxDOT to establish targets for other performance areas listed in Table 3.

Category	Performance Measure	Applicability	MPOs Set Targets By	LRSTP, RTP, STIP, and TIP
FHWA Safety	Number of fatalities	All public roads	February 27, 2017	Updates or amendments on or after May 27, 2018
	Rate of fatalities	All public roads		
	Number of serious injuries	All public roads		
	Rate of serious injuries	All public roads		
	Number of non-motorized fatalities and non-motorized serious injuries	All public roads		
FHWA Infrastructure	Percentage of pavements of the Interstate System in Good condition	The Interstate System	No later than 180 days after the state(s) sets targets	Updates or amendments on or after May 20, 2019
	Percentage of pavements of the Interstate System in Poor condition	The Interstate System		
	Percentage of pavements of the non-Interstate NHS in Good condition	The non-Interstate NHS		
	Percentage of pavements of the non-Interstate NHS in Poor condition	The non-Interstate NHS		
	Percentage of NHS bridges classified as in Good condition	NHS		
	Percentage of NHS bridges classified as in Poor condition	NHS		

FHWA System Performance	Percent of the person-miles traveled on the Interstate that are reliable	The Interstate System	No later than 180 days after the state(s) sets targets	Updates or amendments on or after May 20,2019
	Percent of the person-miles traveled on the non-Interstate NHS that are reliable	The non-Interstate NHS		
	Truck Travel Time Reliability (TTTR) Index	The Interstate System		
	Annual Hours of Peak Hour Excessive Delay Per Capita	The NHS in urbanized areas with a population over 1 million for the first performance period and in urbanized areas with a population over 200,000 for the second and all other performance periods that are also in nonattainment or maintenance areas for ozone (O3), carbon monoxide (CO), or particulate matter (PM10 and PM2.5)		
	Percent of Non-SOV travel	The NHS in urbanized areas with a population over 1 million for the first performance period and in urbanized areas with a population over 200,000 for the second and all other performance periods that are also in nonattainment or maintenance areas for ozone (O3), carbon monoxide (CO), or particulate matter (PM10 and PM2.5)		
FHWA System Performance (Continued)		All projects financed with funds from the 23 U.S.C. 149 CMAQ program apportioned to State DOTs in areas designated as nonattainment or maintenance for ozone (O3), carbon monoxide (CO), or particulate matter (PM10 and PM2.5)		
	Total Emissions Reduction		No later than 180 days after the state(s) sets targets	Updates or amendments on or after May 20,2019

FTA Transit Asset Management	Rolling Stock	The percentage of revenue vehicles (by type) that exceed the useful life benchmark (ULB)	No later than 180 days after the state(s) sets targets	Updates or amendments on or after May 27, 2018
	Equipment	The percentage of non-revenue service vehicles (by type) that exceed the ULB		
	Facilities	The percentage of facilities (by group) that are rated less than 3.0 on the Transit Economic Requirements Model (TERM) Scale		
FTA Transit Asset Management	Infrastructure	The percentage of track segments (by mode) that have performance restrictions		

Table 3 – FHWA/FTA Performance Measures

## Safety

The 2017 State of Safety Report sets a baseline for safety crash data and analyzes regional trends to inform performance target setting. Report figures serve as a baseline for subsequent years to measure whether there was significant improvement in Safety Performance Management compared to the previous year.

The Safety Performance Management (PM) Final Rule established the following five performance measures to carry out the Highway Safety Improvement Plan (HSIP): the five-year rolling averages for: (1) Number of Fatalities, (2) Rate of Fatalities per 100 million VMT, (3) Number of Serious Injuries, (4) Rate of Serious Injuries per 100 million VMT, and (5) Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries.

The Texas Strategic Highway Safety Plan estimated the probable number of fatalities for 2022, the target year. Based on the probable number, targets were set at a 2% reduction for all performance measures. FHWA requires MPOs to either support state targets or establish their own specific targets for the same five safety performance measures for all public roads in the MPO planning area, within 180 days after the State establishes statewide targets. The MPO will then report targets to the State when requested, and determination about making significant progress statewide will be made when at least four out of five targets are met or the outcome for the performance measure is better than the baseline performance the year prior to the target year.

H-GAC's Transportation Policy Council approved a resolution to support the State's safety targets for the five performance measures as adopted by the State. H-GAC has committed to participate in advancing crash reduction strategies through the Regional Safety Plan and will annually assess progress on Safety Performance Measures. H-GAC will also incorporate performance measure reporting and strategies into the 2045 RTP. Table 4 shows the 2015 and 2016 regional totals for each of the five safety performance measures. In February 2018, the TPC

approved safety targets that supported the States' performance targets for safety. Table 5 shows a two percent reduction in all safety performance measures from 2018 to 2022.

<b>Safety Performance Measures</b>	<b>2015</b>	<b>2016</b>
Number of Fatalities (FARS)	618	697
Rate of Fatalities per 100 million VMT	1.1	1.4
Number of Serious Injuries (CRIS)	3,509	3,390
Rate of Serious Injuries per 100 million VMT	6.5	6.6
Number of Non-Motorized Fatalities and Serious Injuries (CRIS)	540	615

Table 4 – Federal Safety Performance Measure Regional Stats

<b>Performance Measures</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
Number of Fatalities	0.0%	0.4%	0.8%	1.2%	1.6%	2.0%
Rate of Fatalities (per 100 million vehicle miles travelled)						
Number of Serious Injuries						
Rate of Serious Injuries (per 100 million VMT)						
Number of Non-motorized Fatalities & Serious Injuries						

Table 5 – H-GAC Regional Safety Performance Targets

H-GAC, along with state and local government partners, has made significant investments in transportation infrastructure improvements through the 2017 Transportation Improvement Program (TIP). H-GAC is also developing a Regional Safety Plan to recommend crash reduction strategies. The fiscally-constrained 2040 RTP recommended approximately \$692 million of investments in ITS and Safety projects and programs. These are the remainder of the investments that do not fit into the corridor-based investments.

	STRATEGY 1 SYSTEM MANAGEMENT AND OPERATIONS	STRATEGY 2 STATE OF GOOD REPAIR	STRATEGY 3 MULTIMODAL NETWORK EXPANSION WIDENING	STRATEGY 3 MULTIMODAL NETWORK EXPANSION CONSTRUCTION	STRATEGY 4 DEVELOPMENT COORDINATION	TOTAL
REGIONAL INVESTMENT PROGRAMS						
ITS/Safety <i>Includes certain roadway improvements, installation of computerized traffic control systems, Incident Management</i>	\$679,082,552	\$13,033,372	N/A	N/A	N/A	\$692,115,924

Table 6 – RTP 2040 Investments

Additionally, a total of 85 projects were approved by the TxDOT Traffic Operations division at a cost of \$32.4 million (Safety Funds) from FY 2018-2021.

### **Transit Asset Management**

The Moving Ahead for Progress (MAP-21), final rule 49 USC 625 established a strategic and systematic process of operating, maintaining, and improving public capital assets effectively through their entire life cycle. This rule became effective October 2016 and includes definition of “Transit Asset Management Plan” (TAM) and “State of Good Repair” (SGR). It establishes performance measures for equipment, rolling stock, infrastructure, and facilities asset categories. These requirements included the performance measure to be reported to National Transit Database (NTD). The resulting information of the NTD is intended to help any level of government make investment decisions. The Final Rule requires all transit agencies that are designated recipients and subrecipients of federal funds to develop initial State of Good Repair targets in January 2017 and complete a TAM Plan by October 1, 2018. The Final Rule also requires H-GAC to set a regional target by October 1, 2018.

Transit providers that receive federal funds as recipients or as sub-recipients and either own, operate or manage capital assets used in providing public transportation are required to develop and implement TAM Plan and submit performance measures, annual condition assessments and targets to NTD by October 1, 2018. Sub-recipients and Tier II providers (that operate one hundred or fewer vehicles) have the options to develop a group TAM Plan with TxDOT/ H-GAC or develop their own plan. Participants must coordinate to determine their specific roles and responsibilities and complying with the rule.

The majority of the assets in our region belong to Tier I provider METRO who develops their own TAM Plan and targets. The Tier II providers that receive urban funding (5307) can either set their own targets because they are direct recipients or could opt to be under TxDOT’s Group Plan. The additional Tier II providers in our region (5311 and 5310), have a choice to set their own or participate with TxDOT. H-GAC collaborated with TxDOT and Tier I and Tier II providers to set regional targets. H-GAC has 180 days after the date on which the relevant TxDOT or providers of public transportation establish its performance targets.

Tier I transit providers:

- METRO (Harris County Metropolitan Transit Authority)
- Galveston Island Transit

Tier II transit providers:

- Harris County Transit
- Fort Bend County Transit
- Brazos Transit District
- Conroe Connection Transit
- The Woodlands Transit
- Connect Transit



The Regional Transit Coordination Committee held meetings during 2017 and 2018 to discuss the process required to formulate TAM Plans and targets. In May 2018, the Transportation Policy Council approved an interagency Memorandum of Understanding between the region's transit operators, the TxDOT and H-GAC to facilitate regional collaboration and promote a performance-based planning process. Transit agencies across the region and TxDOT submitted preliminary agency-level targets for FY 2018, 2020 and 2022 to H-GAC staff. H-GAC staff led the coordination efforts for target setting and TAM Plan development with the Regional Transit Coordination Subcommittee (RTCS). The RTCS established a TAM Plan Working Group with the objective of developing H-GAC regional targets and promote State of Good Repair of capital assets. The working group formulated a methodology for the regional targets in the four (4) areas of rolling stock, equipment, facilities, infrastructure. While the working group was developing the methodology in August 2018, H-GAC staff presented TAM informational updates to the Technical Advisory Committee (TAC) and the Transportation Policy Council (TPC). The TAM Plan Working Group endorsed a methodology for target setting based on a weighted average of asset management scores for Tier I and Tier II transit providers for their rolling stock, equipment, facilities and infrastructure. Based on the weighted average method, the draft regional targets were presented and approved by the Regional Transit Coordination Subcommittee on September 6th. The TAC and the TPC provided final approval of H-GAC's regional transit targets in September 2018, as described in Table 7.

The H-GAC regional Transit Asset Management Targets, along with Tier I, Tier II and TxDOT's targets are identified in Table 7. The Transit TAM targets were approved by the Transportation Policy Council on September 28, 2018.

Transit Asset Management Performance Measures and  
Targets by Asset Category

Asset Category & Performance Measures	FY 2018	FY 2020	FY 2022
<b>Rolling Stock – Revenue Vehicles - Age</b> % of revenue vehicles that have met or exceeded their ULB			
Tier I Target	10%	10%	10%
Tier II Target	19%	16%	17%
TxDOT Target	15%	15%	15%
Regionwide Target	11%	11%	11%
<b>Equipment – Non – Revenue Vehicles – Age</b> % of non-revenue vehicles that have met or exceeded their ULB			
Tier I Target	46%	46%	46%
Tier II Target	0%	0%	0%
TxDOT Target	15%	15%	15%
Regionwide Target	46%	46%	46%
<b>Facilities – All buildings/Structures – Condition-TERM</b> % of facilities have a condition rating below 3.0			
Tier I Target	54%	54%	54%
Tier II Target	75%	67%	60%
TxDOT Target	15%	15%	15%
Regionwide Target	55%	55%	54%
<b>Infrastructure – Fixed Rail Guideway, tracks, signals &amp; systems - % of rail infrastructure with performance (speed) restrictions, by mode</b>			
Regionwide Target	0%	0%	0%

Note: Useful Life Benchmark (ULB) is the expected lifecycle of a capital asset for a transit provider's operating environment, or the acceptable period of use in service for a transit provider's operating environment. Transit Economic Requirements Model (TERM) Scale: Facility condition assessments reported to the NTD have one overall TERM rating per facility. TERM Rating –Excellent – (4.8-5.0); Good – (4.0-4.7); Adequate – (3.0-3.9); Marginal – (2.0-2.9); Poor (1.0-1.9)

Table 7 – Transit Asset Management targets

Tier I and Tier II transit providers in the H-GAC region created their Transit Asset Management (TAM) Plans by the October 1, 2018 federal deadline. TAM Plans contain capital asset inventories for rolling stock, equipment, non-revenue vehicles, facilities and rail infrastructure. Rail infrastructure applies to METRO only. Investment prioritizations, decision support tools, as well as, risk mitigation, maintenance, acquisition and renewal strategies are the core activities of the TAM Plans.

Addressing the federal requirements of the Transit Asset Management Plans, federal, state and local funding has been identified in the 2019 – 2022 Transportation Improvement Program (TIP). Funding will be used to focus on transit asset management and planning, life cycle and safety of equipment, vehicles and other assets and infrastructure used by transit agencies, such as buses and vans, building and other rail assets. Projects programmed in the 2019-2022 TIP that address State of Good Repair requirements reflect an overall investment of approximately \$803,000,000 for the region's transit providers.

Regional transit provider's TAM Plans summarizes revenue rolling stock vehicles, including buses and light rail vehicles, non-revenue service vehicles, light rail track maintenance right of way assets, public facilities, and operating facilities. TAM Plans have outlined how each provider will monitor, update and evaluate the TAM plan to ensure continuous improvement. On an annual basis, transit providers will track their agency's progress toward the targets, report on their progress, and have the option to revise their targets, if needed. Should transit providers in the H-GAC region revise their targets, H-GAC may revise targets, as well.

The Congestion Mitigation Air Quality Targets (CMAQ) are identified in Table 8. The CMAQ targets were approved by the Transportation Policy Council on September 28, 2018.

#### **2019-2022 CMAQ Emission Reduction Performance Measure Targets (in kg/day)**

<b>Performance Measure</b>	<b>2018 Baseline</b>	<b>2020 2-Year Target</b>	<b>2022 4-Year Target</b>
Emission Reductions NO <sub>x</sub> (kg/day)	453.741	1,419.426	1,883.294
Emission Reductions VOC (kg/day)	66.850	169.301	200.809

Table 8 – CMAQ targets

The Pavement and Bridge performance targets are identified in Table 9 and were approved by the TPC on October 26, 2018.

### **Pavement and Bridge Performance Measure Targets**

<b>Performance Measure</b>	<b>2018 Baseline</b>	<b>2020 Target</b>	<b>2022 Target</b>
Percentage of Pavements of the Interstate in Good condition	48.5%	48.5%	48.5%
Percentage of Pavements of the Interstate in Poor condition	0.0%	0.0%	0.0%
Percentage of Pavements of the Non-Interstate NHS in Good condition	46.7%	46.7%	46.7%
Percentage of Pavements of the Non-Interstate NHS in Poor condition	11.3%	11.3%	11.3%
Percentage of Bridge Deck Area of the NHS in Good condition	48.6%	48.6%	48.6%
Percentage of Bridge Deck Area of the NHS in Poor condition	0.6%	0.6%	0.6%

Table 9 – Pavement and Bridge targets

The System Performance targets are identified in Table 10 and were approved by the TPC on October 26, 2018.

### **System Performance (PM3) Measure Targets**

<b>Performance Measure</b>	<b>Baseline</b>	<b>2020 Target</b>	<b>2022 Target</b>
IH Level of Travel Time Reliability	63%	63%	63%
Non-IH Level of Travel Time Reliability	73%	73%	73%
Truck Travel Time Reliability	2.1	2.1	2.1
Annual Hours of Peak Hour Excessive Delay per capita	14	14	14
Percent Non-SOV Travel	20.1%	21.1%	22.1%

Table 10 – System Performance (PM3) targets

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- <sup>i</sup> Regional Hazard Mitigation Plan: [http://www.h-gac.com/community/community/hazard/hazard\\_mitigation\\_plan.aspx](http://www.h-gac.com/community/community/hazard/hazard_mitigation_plan.aspx)
- <sup>ii</sup> Together Against Weather campaign: <http://www.h-gac.com/taq/hurricane/taw.aspx>
- <sup>iii</sup> <http://www.h-gac.com/community/CEDS/documents/CurrentCEDS.pdf>
- <sup>iv</sup> Homeland Security Planning program <http://www.h-gac.com/safety/homeland-security/default.aspx>
- <sup>v</sup> <http://www.ourregion.org/download/OurGreatRegion2040-FINAL.pdf> (page 30 and 31)
- <sup>vi</sup> <https://www.chron.com/neighborhood/bayarea/news/article/Galveston-hits-record-high-tourism-revenues-11175775.php>
- <sup>vii</sup> <http://www.houstontx.gov/council/c/committee/20150625/tourismmasterplan.pdf>
- <sup>viii</sup> <http://www.h-gac.com/community/CEDS/regional-economic-development-plan.aspx> (page 17)
- <sup>ix</sup> <http://www.h-gac.com/community/CEDS/regional-economic-development-plan.aspx> (page 16)
- <sup>x</sup> <http://www.h-gac.com/community/CEDS/documents/CurrentCEDS.pdf> (page 19)
- <sup>xi</sup> <http://www.h-gac.com/community/CEDS/regional-economic-development-plan.aspx> (page 23)
- <sup>xii</sup> <http://www.h-gac.com/community/CEDS/documents/CurrentCEDS.pdf> (page 20)
- <sup>xiii</sup> <https://www.h-gac.com/taq/transportation-committees/TAC/regional-transit-coordination-subcommittee/agendas/documents/october-2015/Presentation%20toTransit%20Coordination%20Subcom%20100815.pdf> (page 10)
- <sup>xiv</sup> <http://www.h-gac.com/taq/regionally-coordinated-transportation-plan/documents/regionally-coordinated-transportation-plan.pdf> (page 20)
- <sup>xv</sup> <http://www.h-gac.com/taq/regionally-coordinated-transportation-plan/documents/regionally-coordinated-transportation-plan.pdf> (Page 6)